

CLAIMS

WE CLAIM:

1. A method for detecting the presence of quinolone resistant *E. coli* strains in a biological sample, comprising
 - (i) obtaining DNA from a biological sample;
 - (ii) optionally isolating DNA from the sample and/or amplifying the DNA contained in the sample with primers specific for a given target sequence;
 - (iii) contacting the DNA contained in the biological sample or obtained in step (ii) with a micro-array comprising at specific predetermined locations of the array two sets of capture probes, derived from the sequence of a *gyrA* gene of *E.coli*, comprising the sequence R_1 -(X)- R_2 , wherein
 - (a) X designates all permutations of the triplet at amino acid position 83 and 87 of the *gyrA* polypeptide of *E.coli*;
 - (b) R_1 and R_2 are sequences derived from the *gyrA* gene of *E.coli* adjacent to the triplet of either position 83 or 87 of the *gyrA* polypeptide and comprising of from about 5 to 20 nucleotides;under conditions allowing hybridization of complementary strands; and
 - (iv) determining at which location on the array binding occurs,wherein a change in the nucleic acid at at least one of said positions results in a change of an amino acid and is indicative of the development of a resistance against quinolones.
2. The method according to claim 1, wherein the change in the nucleic acid sequence results in an amino acid change of the *gyrA* polypeptide to leucine at position 83 and/or asparagine or tyrosine at position 87.
3. The method according to claim 1, wherein the sequences R_1 and R_2 are designed such that known nucleic acid changes at amino acid position 85 and 89 are considered.
4. The method according to claim 1, wherein the micro-array additionally comprises at specific predetermined locations of the array at least one additional set of capture probes,

derived from the sequence of a parC gene of *E.coli*, and selected from a nucleotide sequence comprising the sequence R₁-(Y)-R₂, wherein

- (a) Y designates all permutations of the triplet at amino acid position 80, 84 or 87 of the parC polypeptide of *E.coli*;
- (b) R₁ and R₂ are sequences derived from the parC gene of *E.coli* adjacent to the triplet of either position 83, 84 and 87 of the parC polypeptide and comprising of from about 5 to 20 nucleotides;

wherein a change in the nucleic acid at at least one position in the sequence results in a change of an amino acid and is indicative of the development of a resistance against quinolones.

- 5. The method according to claim 1, wherein the DNA obtained from a biological sample is amplified by means of PCR.
- 6. The method according to claim 5, wherein the DNA is fragmented prior to the contacting step.
- 7. The method according to claim 6, wherein the DNA is fragmented to pieces having a length of from about 10 to about 40 nucleotides.
- 8. The method according to claim 1, wherein the micro-array contains capture-probes as listed in table I.
- 9. The method according to claim 1, wherein the DNA is labeled prior to contacting it with the capture probes.
- 10. The method according to claim 9, wherein the label is selected from the group consisting of fluorescence label, colorimetric label, radioactive label, and an enzymatically detectable label.

11. A micro-array containing at specific predetermined locations of the array two sets of capture probes, derived from the sequence of a *gyrA* gene of *E.coli*, comprising the sequence $R_1-(X)-R_2$, wherein (a) X designates all permutations of the triplet at amino acid position 83 and 87 of the *gyrA* polypeptide of *E.coli* and (b) R_1 and R_2 are sequences derived from the *gyrA* gene of *E.coli* adjacent to the triplet of either position 83 or 87 of the *gyrA* polypeptide and comprising of from about 5 to 20 nucleotides.
12. The micro-array according to claim 11, further comprising at specific predetermined locations of the array at least one additional set of capture probes selected from a nucleotide sequence derived from the sequence of a *parC* gene of *E.coli*, and comprising the sequence $R_1-(Y)-R_2$, wherein (a) Y designates all permutations of the triplet at amino acid position 80, 84 or 87 of the *parC* polypeptide of *E.coli* and (b) R_1 and R_2 are sequences derived from the *parC* gene of *E.coli* adjacent to the triplet of either position 83, 84 or 87 of the *parC* polypeptide and comprising of from about 5 to 20 nucleotides.
13. A kit for detecting the presence of a quinolone resistant *E. coli* strain in a biological sample, containing a micro-array according to claim 11 and optionally buffers and reagents.